# Tertiary Color Theory from Crayons

by

**Michael A. Carter**

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# Mixed Up Colors

This is a color swatch page made from a box of 64 Crayola Crayons. Each color is in the same place it occurred in the box.

Pretty confusing, huh?

If you want to learn how to make sense of them read on. This text is about using crayons to teach color theory.

This is a bucket of oil paints. They don't all fit into the bucket. I don't own all the colors that I could. The nice thing is that they last and last. If you want to learn how to make sense of them another book is being made.

My college degree is in Fine Arts; after a time, I went back to college and became certified to teach art in the Public Schools, K-12. After my day teaching job, I painted in my studio. Actually, I only taught half days for years and painted the other half in the mornings. Pretty cool. That is why you see crayons and oil paints. Middle Schools have lots and lots of crayons and I have lots of oil paints.

All those colors are a big problem. I had to come to terms with my oil paints and I had to teach boys and girls how to use their crayons. Teaching about what you are studying is a big help in learning. I was studying color theory and teaching it.

The other art teachers taught color theory in a way that was not consistent or correct to my way of thinking. I started teaching as a substitute and I was able to look at old lesson plans, mimeographs, hand outs, and samples in file cabinets. When it came my turn to introduce color theory to students, I made some changes.

The old lesson plans stated that there is a color wheel that contains primary colors, secondary colors, and tertiary colors. So far so good. The primary colors cannot be mixed and they go together to make the other colors. In-between primary colors on a color wheel are secondary colors that are made by mixing two primary colors together. In-between a secondary color and a primary is a tertiary. That is where we parted company.

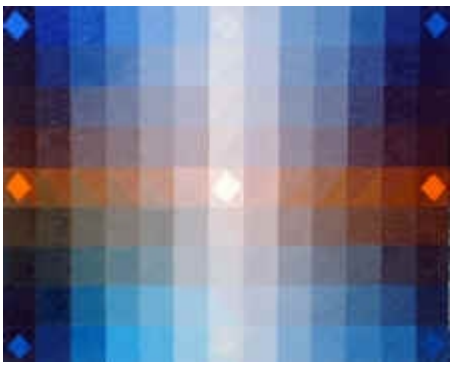
They started by describing the color organization scheme in terms of unique individual parent primary colors. Prime means one. Each primary color is one unique color. Two different primary colors are mixed together (in theory, you don't mix crayons like you do oil paint, you just get the other color) and the mixture is a secondary color. The word is secondary. Secondary because there are two colors in it. Those colors are then placed on the color wheel in-between the primary colors that they are made out of. First they are mixed, then they are placed.

Now, the color wheel has a space in-between all those colors and that is where the old lesson plans say to put the tertiary colors. That is where they go wrong. The colors that are placed there are mixtures of the primary parent color and the half and half mixture in the middle, the secondary color. There are still only two colors in the mixture. It is a unbalanced mixture that has more primary than the other. The confusion arises when they say to place the mixture into the third place. So the mixture is called tertiary after the third place. They started talking about the number of different primary colors in a mixture and proceeded to speak of three different places to put the colors. That is confusing.

A tertiary color has three different primary colors in it. Those mixtures do not fit on a color wheel neatly between primary and secondary colors. Tertiary means three primary colors, not the third place on a wheel to put colors into. Tertiary colors are mixed with other colors ACROSS the wheel on the other side, not by mixing with adjacent colors. The proper name for that third space is intermediary color. They are intermediary between a primary and a secondary color.

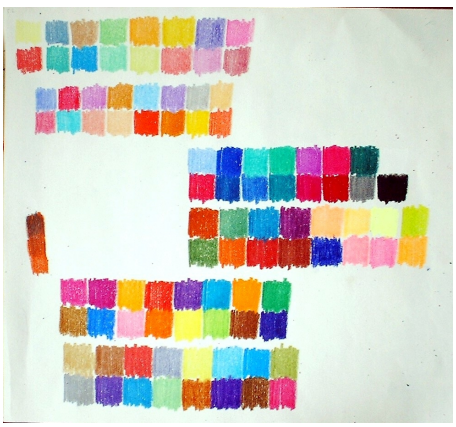
When color mixing and color theory was approached from that direction, consistency in the use of terms, new exciting discoveries were made. Beautiful pictures were made by my students that never would have been if they were taught a different way. They liked them. The pictures looked great on display. We did need to learn how to mix crayons together in order to make the colors; later, we used tempera paints and made large sized paintings with three primary color mixture tertiary colors. They were fantastic! I made many different crayon pictures; yes, a professional fine artist used crayons for original works. I still have them. You will see them in this book.

Work in my own studio was proceeding along realistic tonal painting directions. I was interested in the Dutch masters and vanity paintings for art history lessons. Color **Tones** may be made by mixing grays with colors and that is one way the old masters painted, but they are also made by mixing Complimentary colors. Such colorful mixtures all have the three Primary colors in them in different proportions.



Different kinds of color charts, other than the color wheel, are used to describe grayed colors. Color charts, graphs, and mixture guides are just another kind of painting. Some of my color charts became nice oil painting works in their own right.

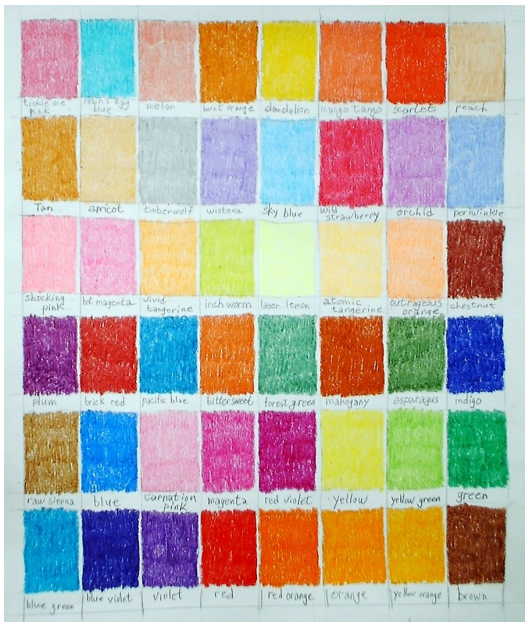
# Crayons



Much of this information came about as a unit of instruction on color theory for early middle school students - grade 5 - as taught in Public Schools in the mid 90's. What you will see is what the students saw. They saw the 64 color chart first; it is on the previous page. You will see my samples and instruction sheets made for the art class. Actually, you will see less than they did because many of my samples went missing. However, there are as many as the first year I taught it. Later, many more samples were made. More sections have been added.

In November 2005 I returned to use crayons and investigate a box of 96 Crayola Crayons. That is a lot of crayons to sort out. Above is a page showing all of those crayons.

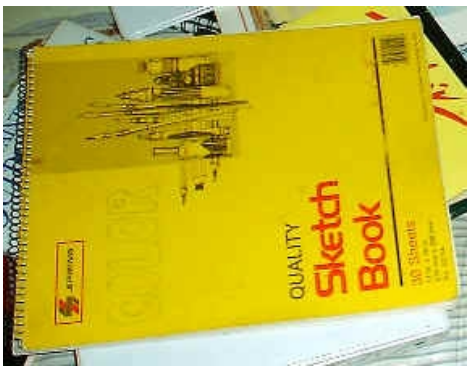
One of the first things I learned is that more crayons will fit into a box if they are all in the little boxes stacked up neatly than if they are thrown in any old way. Now, after they are broken and much shorter, you can't do that. Then, they all end up in a big box. That is when you need charts. Each color is one of the crayons. Each two rows is a little box. Each color is named. If you color an unknown piece of crayon on a part of an index card you can find out the name of it off the chart. If you don't make the chart first the crayons will get broken and the paper removed and you will not easily be able to name the pieces.



Each of the 96 crayons comes with a name which is printed on the label. Here are all of them made into two full page charts with the names under each sample swatch just as they were packed. Why these colors?

24 color crayon boxes are easier to work with. Here they are as packed, colored freehand as small swatches across the tablet. Is there some reason for them?

A supply closet in the public school had lots of art supplies in it. Crayons had been saved loose over the years in a large cardboard box. It smelled great. Some crayons had melted together and were discarded, but most were fine to use. I dipped both my hands into them and let them run out over my fingers. Scrooge in his money bin had it no better. There were also boxed crayon sets of different kinds and numbers. Mostly, there were boxes of 16 crayons and they were in good shape.




## Lesson:

That is what we used and where we start here in these lessons. **Get yourself a box of 16 crayons and a tablet**. It won't cost even $10. Get two boxes of 16 crayons and leave one to look at. The one you use will be all chewed up and the crayons will end up short, broken, without labels, and the original box will be trashed. Save the little pieces and start a collection like I found. The sketch book at the left and a box of 16 crayons were bought at a local corner store for my work at home.

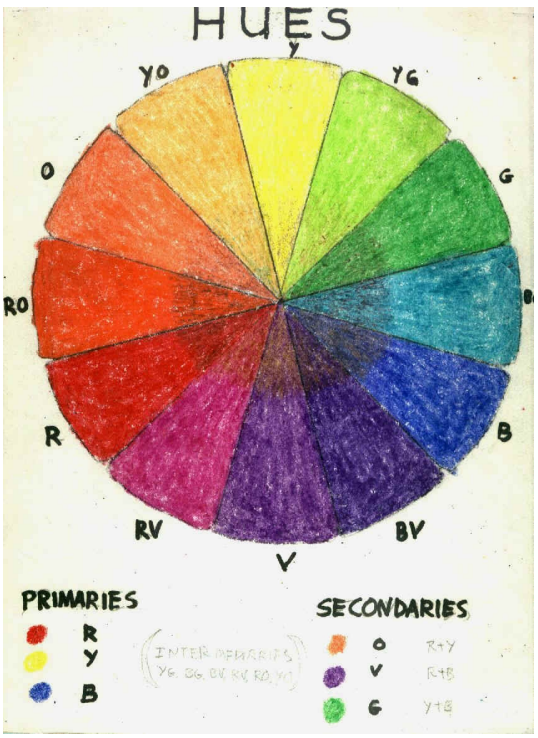
Crayolas are what I use. Others are fine as long as they have the same basic colors as named. There are 12 basic colors in the box and four extras. **Yellow, Yellow-Orange, Orange, Red-Orange, Red, Red-Violet, Violet, Blue-Violet, Blue, Blue-Green, Green**, and **Yellow-Green** are the basic colors. Color is easy to teach when they are named like that. The other four are, **Brown, Carnation Pink, White**, and **Black**.

The sketch book has soft yellowish paper that is a little rough. Smooth hard white paper is not as good as the crayons smear too easily. Spiral binding is best. Keep the pages in the book; do not remove them. Make other ones for framing. Size of papers used in classes was 9" x 12" and my sketch book was 11" x 14", later, a much larger one was used. Now, oil paints are being used in the same way.

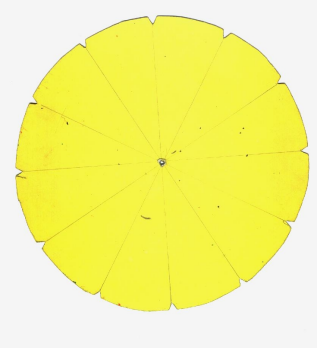
Other materials to have are a ruler, tissues, a pencil, and eraser.

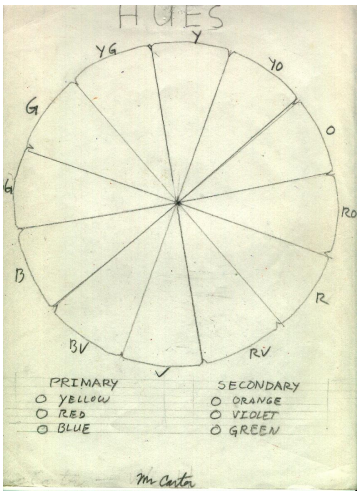
A box of 16 Crayolas gives you a 12 **hue** color wheel and four **values**. That is why those are in there. One of the four values is a **tint**, Carnation Pink, and one is a **shade**, Brown. White and Black are supplied so you can make your own values of the other hues. Bold words are vocabulary specific to color theory and will be defined more below.

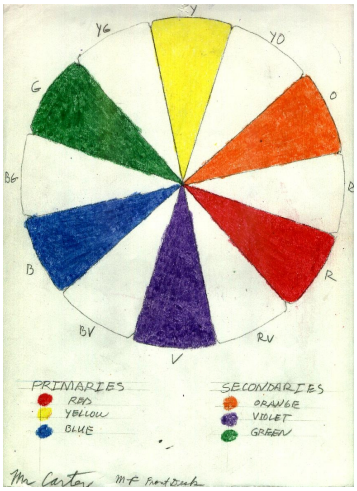
Most of a color theory are included in one box of crayons. All you have to do is make a color wheel and some value charts and you are well on your way to understanding color and in making sense of thousands of other colors.




First, make a color wheel. Use it to make color pictures and sense of all the other crayons.






A 9 x 12 paper Color Wheel may be colored to the right or to the left. It does not matter which side Red is on or either if Yellow is at the top or not. They just have to be in the same order. It is labeled. The center does not need to be shaded.

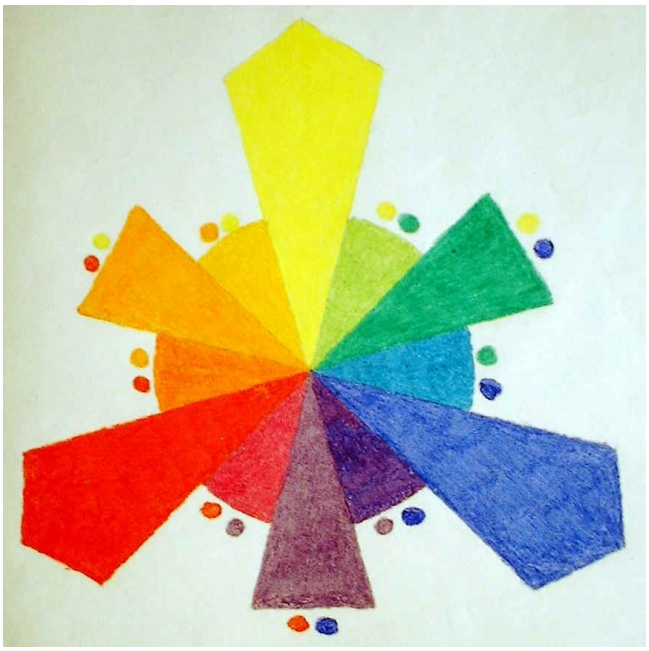
A pattern cut out of oak tag makes it easy to draw for my young students. Guide lines are used to label it. Soft paper is placed under the art paper so that crayon coloring is thick and no white dots show through.

Simple, step-by-step, color wheels show 12 hues and some names. A hue is the redness or greenness of a color; it is the wavelength of the light. Color wheels show Hues. They should be labeled with initialed names. V is for Violet; Purple is used on a 10 hue wheel.

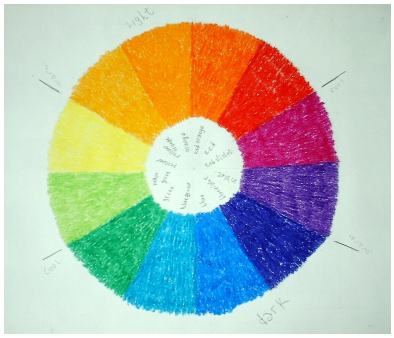
One other sample page could be made that shows three **Primary** hues in place. There would be three spaces between each Primary hue. The Primary hues are, Red, Blue, and Yellow. Prime means one. Primary colors come first and they can be used to make the other colors. Bright primary colors cannot be mixed from other paints.

Orange is placed between Red and Yellow. Violet is placed between Red and Blue. Green is placed between Yellow and Blue. They are called **Secondary** hues because they can be mixed from each of the two Primary hues on either side of them. However, those color crayons are nicely provided for us already. And they are brighter.

The six spaces left over, in-between each of the colors put down so far, are also filled with Secondary colors. Each one has the name of the middle Secondary color that is like it. Yellow-Orange is an Orange that has more Yellow than Red in it. The spaces are called intermediary because they are in the middle and in-between the others. The colors are Secondary hues because each one has only two Primary hues in them. We are naming colors and not so much the spaces used to hold them in. Yellow-Orange is a Secondary hue as is Red-Orange as is Orange. All Secondary hues have two Primaries in them.

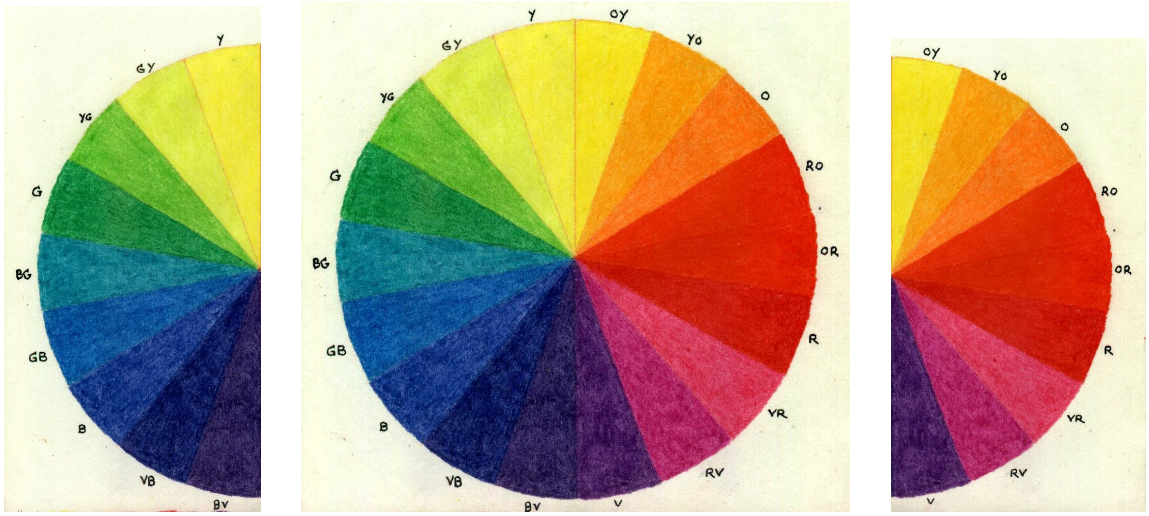


The size of this sample color wheel or star is a full sheet of white sulphite art paper that was 24” x 36”. There are many ways to represent colors and theories of them. Here are some more.



The more crayons you have in a set, the more Hues or colors would go into your color wheel. Twelve hues are all we need to work with now.

I purchased a rather large drawing tablet in a local store in order to make samples and keep them bound together. I also couldn't resist the box of 24 crayons. It provided even more intermediaries. Two more color wheels were made to show a first use of the color wheel. Warm and Cool colors divide the wheel into two parts. Summer and Winter, day and night, and so on made for interesting discussions.




Color wheels show warm and cool colors on either side. They also show light and dark colors. Boxes of crayons have **bright** color wheel hues in them. The brightest hues may be **light** or **dark**. Any hue may be made lighter or darker with the addition of white or black. Boxes of many crayons have many light and dark hues mixed for you already. Those crayons are sorted out in lessons on using **Values**.

There are three parts to color theory lessons, **Hue, Value, and Tone**. Hue is the color wave length like red or blue, Value is how light or dark a color is, Tone is how bright or dull or how saturated a color is. If a color were mixed with gray paint, half and half, it would be low in tone.

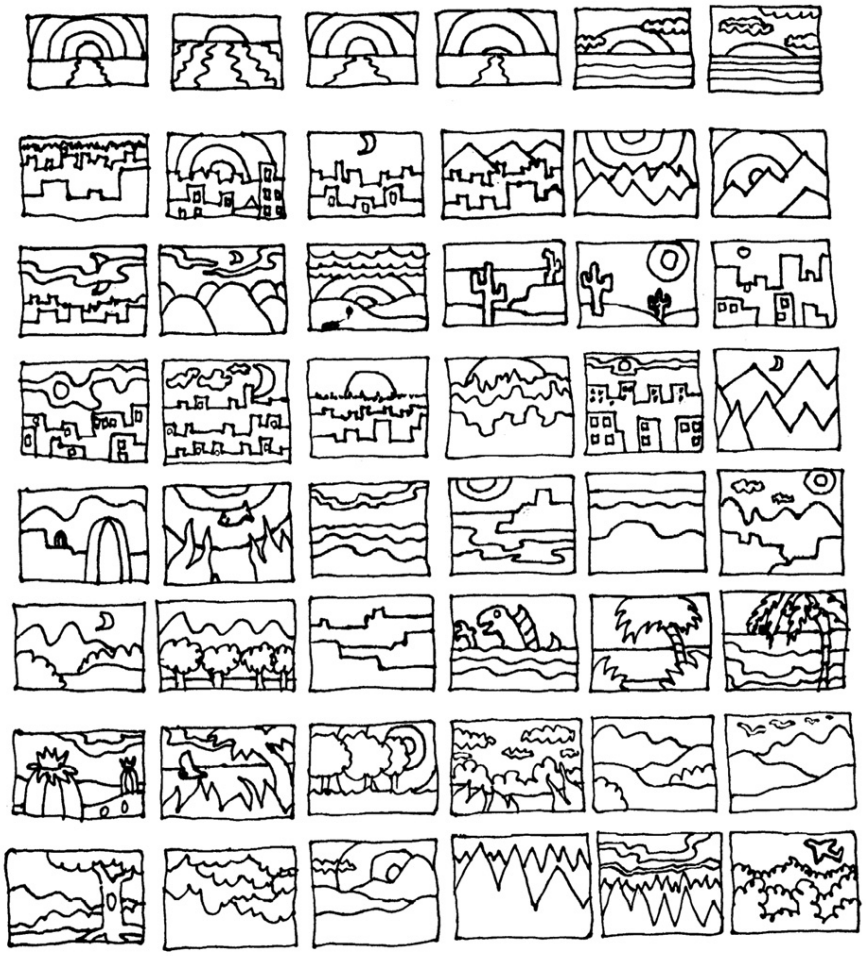
**Lesson:** Color wheel. Pictures may be made using the wheel to help you choose colors. There are many different ways to select colors off a color wheel. The main one I am going to use involves colors next to each other. Three or four colors in a row next to each other are called **Analogous**. They may have one or two primary hues in each of them so they relate to each other. R, RO, O, and YO all have Red in them. They are harmonious because of the red in each of them. They look alike somewhat and form a sequence of dark to light or light to dark. The three secondary hues, RO, O, and YO, all have two primary hues in each of them. They are more alike then, because they have more in common. Red repeats in the first set; red and yellow repeat in the second set. A pattern is formed of the colors repeating. The hues that repeat are the smallest part of the pattern, the Motif. **Harmony** is achieved because repeating hues form a pattern.

# Drawings

Drawing had to be taught just a little in order to have some kind of picture to color in without making many copies of my samples.

Many simple shapes were drawn on the chalk board: puffy curved lines for clouds and smoke, a circle for the sun or moon, a flat line for the sea or dessert, jagged lines for mountains or lightening, box like steps or vertical and horizontal lines for a city.

Below is a collection I put together after a long time at this. Do not let students have long access to it as they will slavishly copy some instead of making up such as seen here.



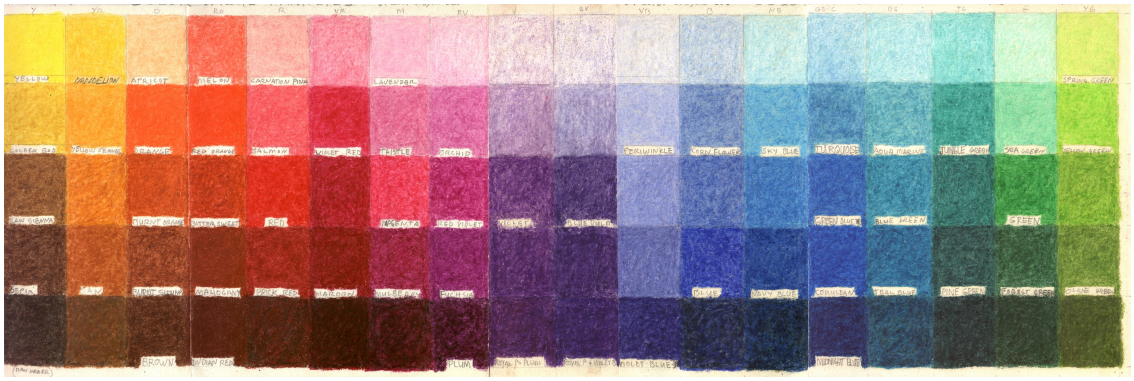
# Values

Put out analogous HUES in the center row across the middle. Add white to the two above for TINTS and add black to the two below for SHADES. Now we have HUES and TINTS and SHADES.

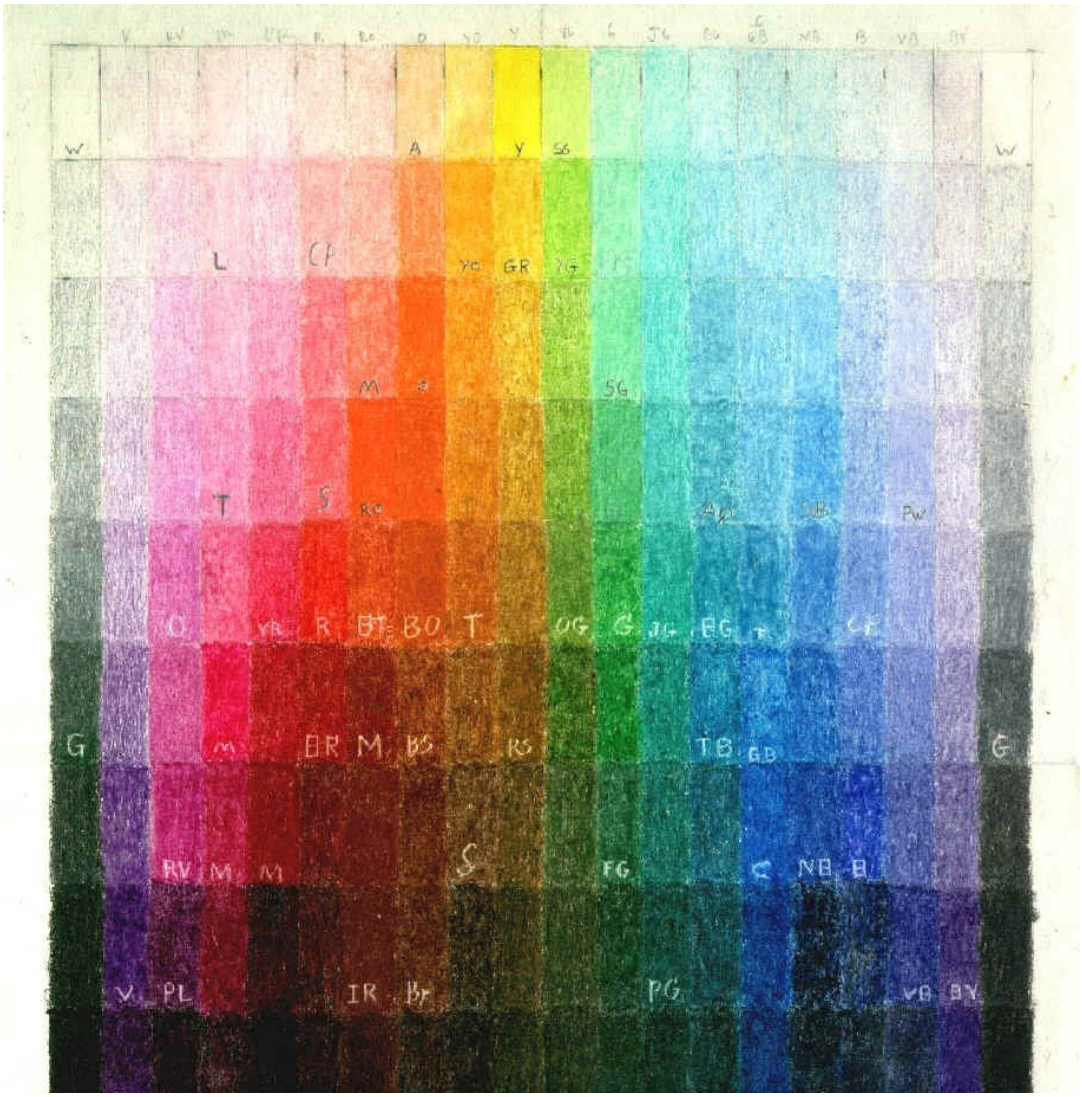
In order to do this lesson properly you really need that soft paper under this art sheet. Even with one or two used, there are still some white dots that show.

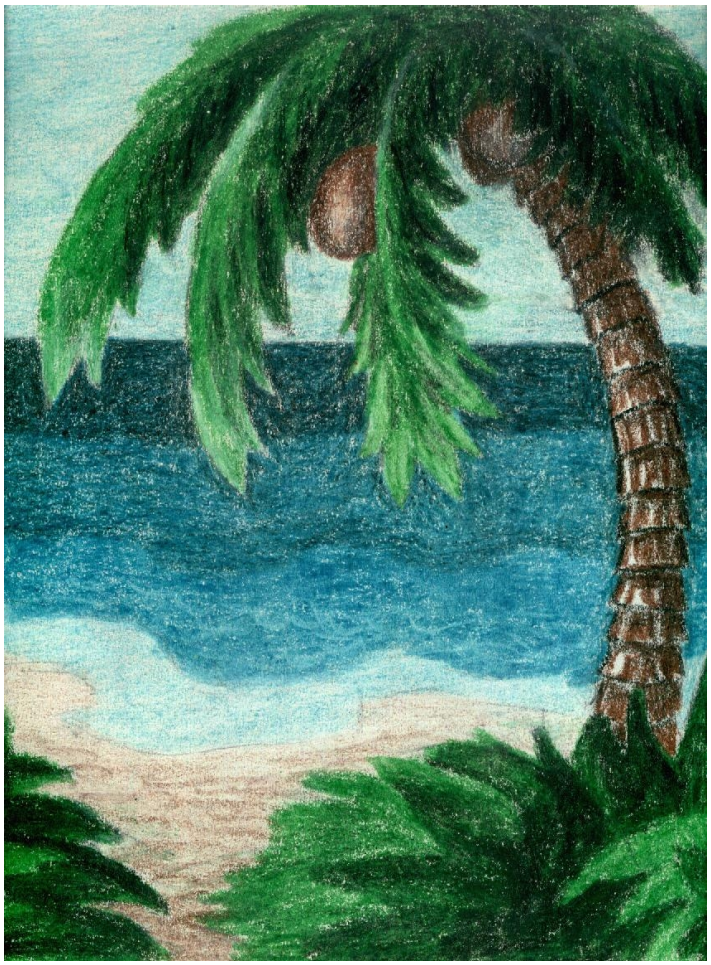
This lesson introduces value scales of hues. It also teaches a crayon coloring techniques, i.e., how to mix colors. In this case we are mixing a color wheel hue with white and with black - not both W and K together but apart from each other. The color wheel hues go in the center. It is wise to choose an analogous set. That way you get some more experience with harmonies, and, you have the start of ALL 12 hues shown as value scales if you choose to do so.

Color mixing is done as follows. The hue is colored heavily as possible in the center only. The bottom row is colored lightly with the black crayon while the art paper is OFF the soft pad and on a hard surface. This will make lots and lots of white dots. That is where the color will show nicely. Above the bottom row and below the middle (I had step by step samples of all of these steps) the black is again colored lightly only this time much MUCH lighter, almost not done at all. Then, the Hue in column one is colored over the middle heavily and all the way down over both boxes of light black and darker light black. No white dots should show. The art paper would be on the pad for this kind of smooth coloring. Now, above the heavily colored hue row in the center, the hue is colored off the pad lightly, then lighter even still. White crayon is added to both, but not the middle. Coloring proceeds in layers, using the pad, then polished with a tissue.

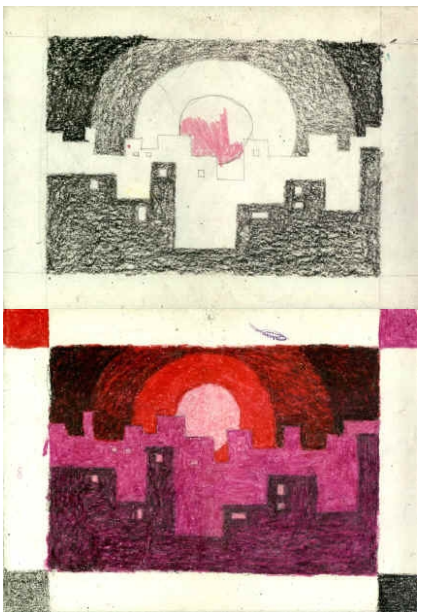


A large box of crayons includes lots of value crayons. Here each one is placed into a Hue column. Many hues are included in a large box but there are even more light and dark crayons. Swatches that were not labeled were mixed from adjacent colors or by adding white or black. Below is a vertical chart with even more values for each hue.

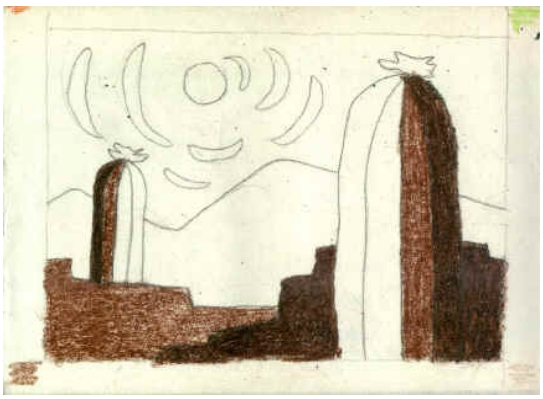




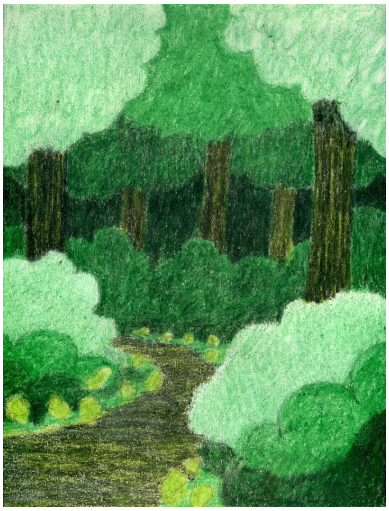
# Analogous Value Samples Gallery



Black was put down first, but not using soft papers under the art paper. That way, white dots are formed for color to fill.



Brown is a shade, so, it may be used under colors, too. I made lots of samples using crayons in order to teach color theory and to motivate my students to make nice art. Crayons are as bright today, 10 years later, as they were then. The pictures have been kept in a drawer and out of direct light.



**Complimentary Tints**

11” x 14” pages in my sketch book hold these pictures within borders, one to a page. They were colored with crayon premixed tints that I saw for sale somewhere local. I’d stay after school or arrive early just to make samples like these.

The colors harmonize because they all have white in them.

The top one uses Yellow Green / Red Violet and Orange / Blue. They are two pairs of complimentary colors that lie across from each other on the color wheel.

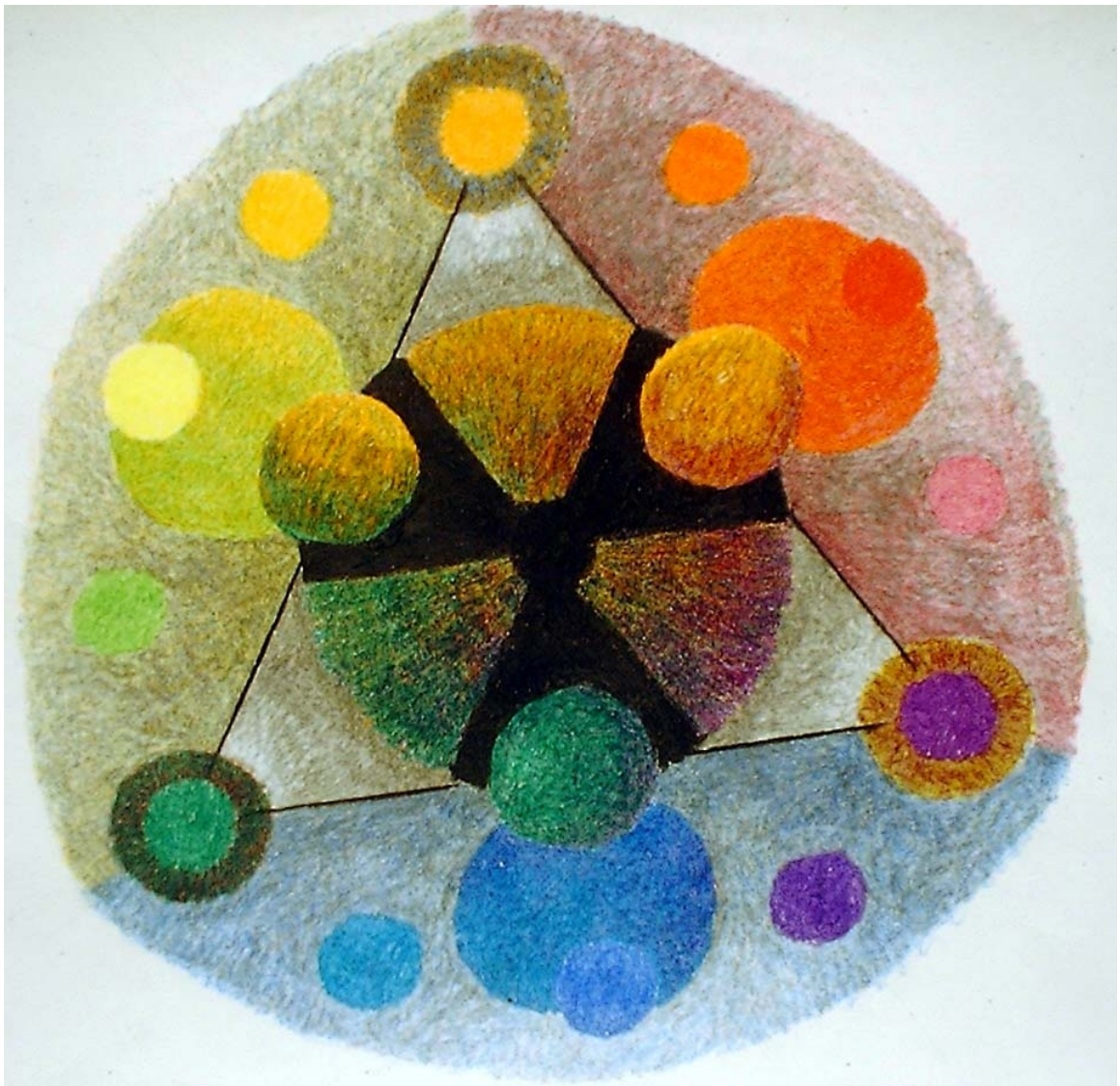
Blue was used as a shade for under the Yellow Green.

**Complimentary Tints** are used in this cityscape, too. Red / Green along with Yellow Orange / Blue Violet are used together.

The picture holds together because all the colors have white in them.

# Tertiary Colors

Tertiary colors have all three primary hues in them. A tertiary color has red, yellow, and blue inside. A color wheel does not have room for tertiary colors on it. You find which hues to mix tertiary colors by looking across from a primary to the three opposite secondary hues. Each one mixed with the primary will make a tertiary color. Now if you start with a secondary hue and look across the wheel you can mix with the primary OR either of the other two sets of secondary hues! That is a lot of mixtures. A different approach is needed to start using colors like this.



24" x 36" Crayons. **"Worlds"**

# TERTIARY COLORS LESSON:

Directions: Choose any three or four pairs of colors and make a picture with simple mixtures of them. Mix all pure hues into tertiary color mixtures.

Use both colors of each pair to fill each area. Your picture will have three or four areas to fill with the color mixtures. Use a simple drawing of three or four areas.

No matter which color pairs you choose, your picture will look good because red, yellow, and blue are in every mixture harmonizing them.

| | | | | | | |
|---|---|---|---|---|---|---|
| **Y-RV** | **Y-V** | **Y-BV** | | | | |
| **YO-RV** | **YO-V** | **YO-BV** | **YO-B** | **YO-BG** | **YO-G** | **YO-YG** |
| **O-RV** | **O-V** | **O-BV** | **O-B** | **O-BG** | **O-G** | **O-YG** |
| **RO-RV** | **RO-V** | **RO-BV** | **RO-B** | **RO-BG** | **RO-G** | **RO-YG** |
| | | | | **R-BG** | **R-G** | **R-YG** |
| | | | | **RV-BG** | **RV-G** | **RV-YG** |
| | | | | **V-BG** | **V-G** | **V-YG** |
| | | | | **BV-BG** | **BV-G** | **BV-YG** |

A twelve hue color wheel gives you the above thirty six tertiary color pairs.
BV-YG is the same as YG-BV so it is only listed one time, one way.

Each primary hue: R, Y, or B, mixes with only three opposite secondary hues to form tertiary colors. Red mixes with the three greens, yellow mixes with the three violets, and blue mixes with the three oranges.

Each secondary hue, however, mixes with seven other colors. Orange mixes with the opposite blue and both secondary color families on either side of blue, namely, the three greens, and the three violets.

The only colors a secondary hue will not make tertiary colors with are those it is made up of, namely, the two primary hues and the other secondary hues of the same family. Orange will not make tertiary colors with yellow, red, yellow orange, or with red orange.

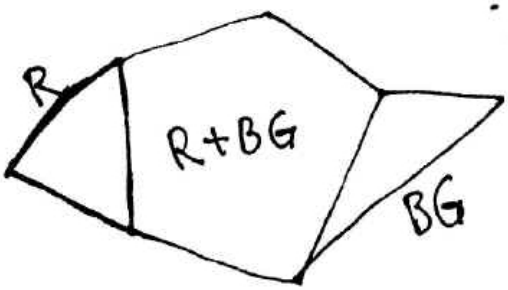
No pairs repeat, all are different.

# TERTIARY COLORS

**a tertiary color has red, yellow, and blue in it.**

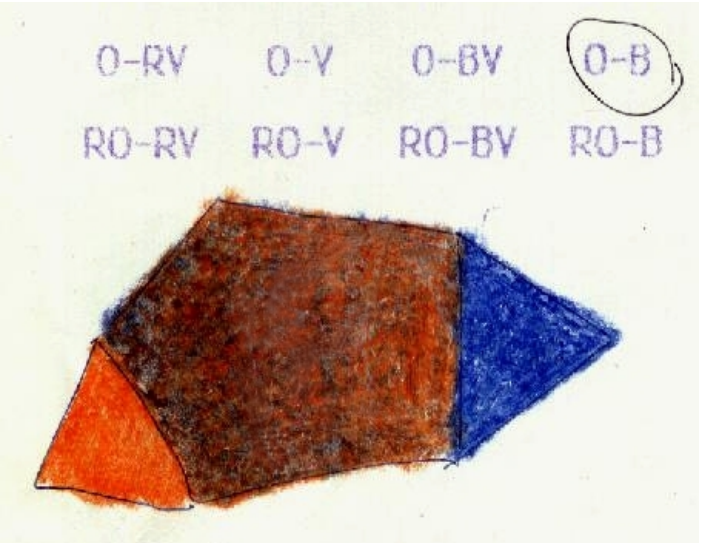
**Directions: Choose any three or four pairs of colors and make a picture of them. Use both colors of each pair to fill each area. Your picture will have three or four areas to fill with the color mixtures. No matter which color pairs you choose your picture will look good because red, yellow, and blue are in every part.**

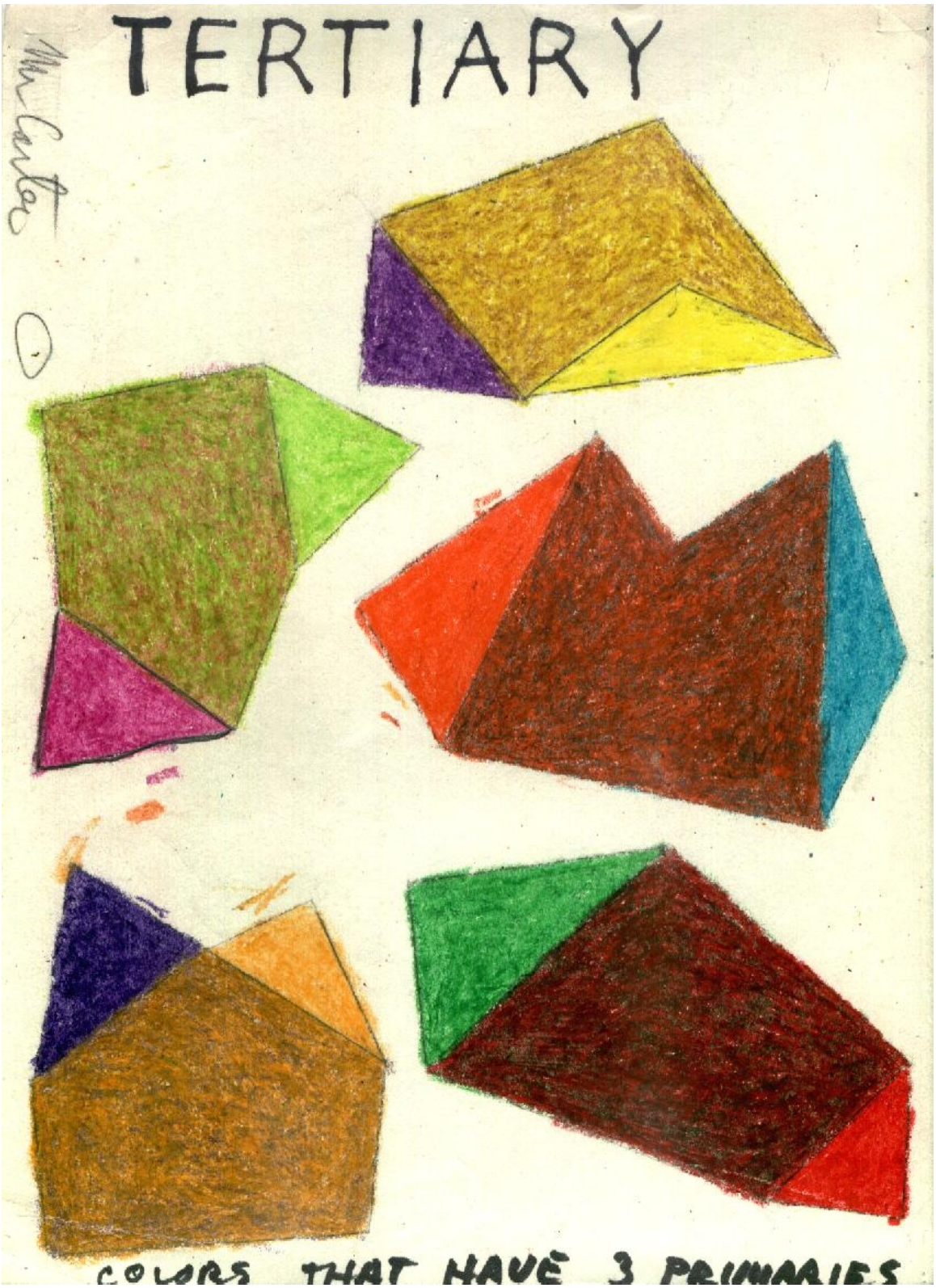
| | | | | | | |
|---|---|---|---|---|---|---|
| Y-RV | Y-V | Y-BV | | | | |
| YO-RV | YO-V | YO-BV | YO-B | YO-BG | YO-G | YO-YG |
| O-RV | O-V | O-BV | O-B | O-BG | O-G | O-YG |
| RO-RV | RO-V | RO-BV | RO-B | RO-BG | RO-G | RO-YG |
| | | | | R-BG | R-G | R-YG |
| | | | | RV-BG | RV-G | RV-YG |
| | | | | V-BG | V-G | V-YG |
| | | | | BV-BG | BV-G | BV-YG |




The image above shows an instruction sheet in use. One color pair has been chosen. A "Kite" as I call it has been drawn. A Kite has about 5 straight sides and two smaller triangles are drawn from two of the sides. Chosen colors to mix are put into each smaller triangle. The mixture is made in the larger central polygon.

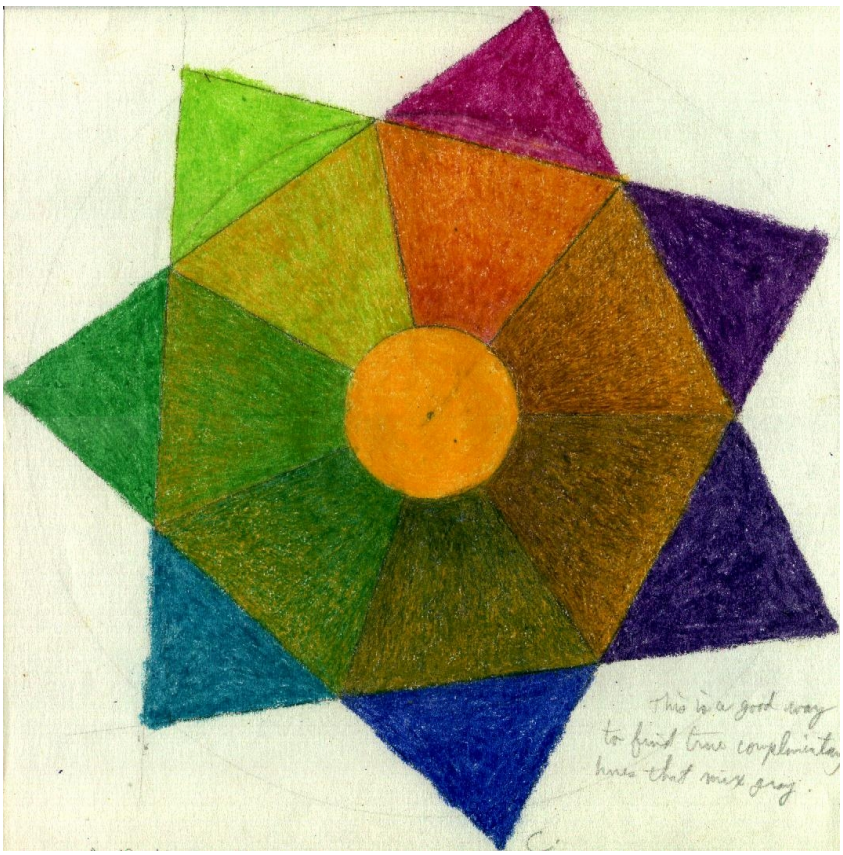
Below is one all filled out from another instruction sheet.





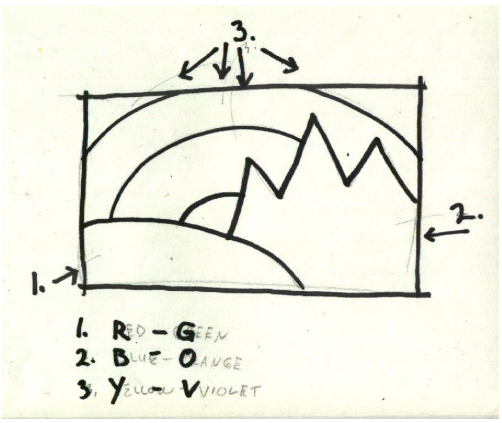

Mixed Tertiary Colors on a 9” x 12” paper

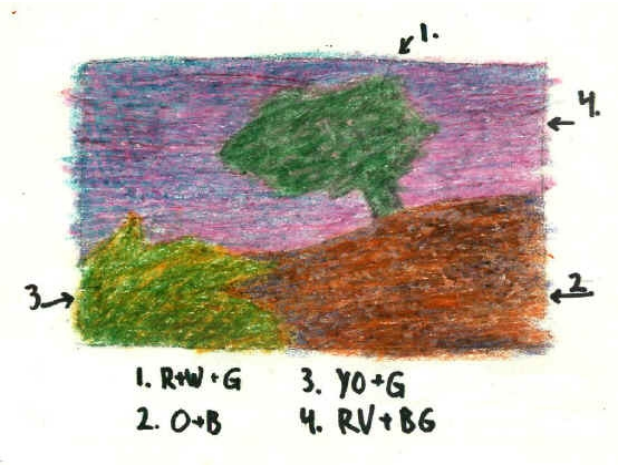
**Sample Tertiary Diagrams**



All 36 Tertiary color pairs have been mixed in 1/2 and 1/2 proportions. 11’ x 14” Crayons

**Lesson**:
Use a half sheet, 6" x 4 1/2. Draw a small rectangle in the center of it. Leave a wide border all around it. Choose 3-4 different Tertiary color pairs from the charts provided. List them using initials at the bottom. Then, color in each area. Do this randomly and it will create harmonious pictures every time. That is because each mixture repeats all three primary hues.




Go back to that page that has all the drawing samples on it and select one to copy. Look up the tertiary color chart and select some of them and fill out the drawing. Little ones like this are fast and easy to finish. Some order at first is very nice to use, like, starting with three secondary hues in one family, analogous hues, on one side, and using some other colors on the other.

One half of the pair may be used to shade with.

**Confusion**. I see a color. Is there a name on the color somewhere? No. It is just a color. My brain puts a name onto it. Tertiary colors do not have names.

**Color**. Lots of colors. Lots of names. Some of them make sense. Gamboges? Nah. Just color. What is a Cerise anyway? I like color. I love a huge box full of peeled and broken crayons. No names. No wraps. No full sized pieces. No order at all. I mean a box that is at least one cubic foot or more in size. Thousand of pieces of crayons from many tens of different kinds of crayon sets. How do you use something like that? Where do Tertiaries go? Into that big box, but, don't throw it out!! A pile of autumn leaves is just like it. They are the colors of the world. You cannot name all those colors. You cannot pin up all those leaves. There is no diagram for it all in one place nor should there be. My brain, the left half of it to be precise, is the only thing that wants it all to be organized. Nature likes the colors all messed up together just like the leftover crayon bin. There is more to the brain, there is another half that likes the colors mixed together, just like nature does. Most of my brain works like that. I see color but later learn a name for it and many others just about like it. All of them are called the same name. I see there are many more colors than names. It is easier to see than to name. I like art. It is bigger and better and nicer than names.

## Color Theory

Color the three Primary Hues (Red, Yellow, Blue) in the center of a paper. Surround them with the Secondaries Color Wheel. Outside of that put all the Tertiary Kites. Outside of that, kites may have white, black, brown or pink added to them. Between the two circles could be one that shows all the uneven mixtures; RV-YG and YG-RV would each show a dominance of the first named hue. That triangle would be larger than the RV triangle denoting there was more in the mixture. That would be a huge color chart.

It is rather like an explosion. The three little ones combine and make 12 and they combine and make many many more.

Tertiary pairs on the normal 12 hue color wheel that are close together, as YG-YO are, are so close together and similar that one mixture is easily done, but, three are difficult to make. YO-YG are as close as they get. One middle mix is a darker yellow. It may be yellowish or greenish depending on how close to the middle or far away from the middle it was made. If we move one side to the next hue, say, O-YG, then, three mixtures are easily made. O-YG would have more Orange in it, YG-O would have more Yellow Green in it, and there would be a middle mixture that cannot be named. YOG? Nah.

We loose the names early on. That is a good thing. We want to move from the left hemisphere of the brain and over into the right one. That is where all the pictures are.

Tertiary pairs on the normal 12 hue color wheel that are far apart, as Y-V or R-G are, are so far apart and dissimilar that each half to the middle may become a scale of nine. Therefore, between R-G there would be a middle gray, making three. On the red side there would be a middle mix between red and gray, middles between them, and middles

between them, making a 9 mixture scale, using oil paints naturally. The same thing would be or could be done on the Green side. All in all, 17 across the circle.

So many different mixtures are possible to make that it becomes an explosion. It looks like a forest in Autumn or a sunset or sunrise; it is a world of colors, beyond all names like values, colors, hues, tonalities, tones, kites, scales, Secondaries, Primaries, Tertiaries, mixtures, paints or crayons.

How many pairs can 17 intermixtures be made with? Do you really want to know? It isn't really useful in free painting to do such things. Chart making, sure, counting and figuring leads to many designs. Free painting, a term a just coined, requires you to know only that many mixtures are possible. Then, you start painting and may or may not use more than usual in some areas.

The three Primaries may be selected from many different Reds, Blues and Yellows. The center would then change continuously depending on which were used. Names of those Primaries could be flashed on screen or appear under the picture on the bottom of the frame or could be narrated.

Primary pairs would move outwards from the center and apart from each other, making trails of mixtures between them. On a 12 hue wheel there are only three Secondaries between any two Primaries. However, they would change depending on which Primary hues were used. In the case of not mixing Primary hues and selecting premixed tube

colors more names would be used. Secondaries would flash between the many paints available. Both activities should be shown.

White and black are added to each of the colors so far. Value scales would be shown, going up and down, although perhaps after the basic idea of the explosion was shown. Value scales would blow apart the color wheel too early.

Gray is added to the hues of the wheel. Hues move away from the center or towards it depending on the intensity of each hue. Fluorescents appear on the outside because they are so bright. Silver swirls go towards the center.

Outside of the Color Wheel could appear Kites copied on each side of Tertiary pairs closest to the parent hues. They could pulsate and change. On one side the triangle containing the hue closest to it would enlarge, while the mixture inside the shape or body of the kite would gradually change in proportion. One could stop at the same size or middle mixture or reverse them on each side of the circle.

That is the nice thing about animation. It moves. Color changes need not be locked into static geometric scales. With animation as a medium, all the mixtures could be shown in one shape, changing over time, growing parts larger and smaller.

Color theories have been likened to globes or spheres. Each one is a little different from the other. They are each like a planet.

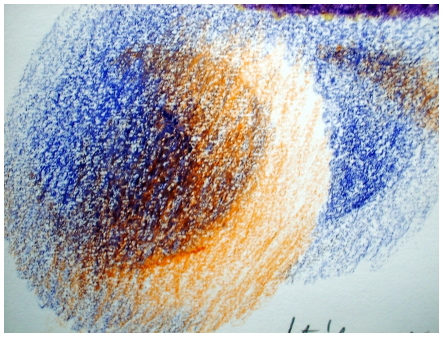
My color theory is likened to a larger sphere, that of the entire solar system. It goes from the center, where the sun would be, out to the Ort Belt, where all the pieces are.

Three Primary Color Paints are the center. That is because I am a painter and I need to know how to mix paint. One part of color theory is that Red, Blue and Yellow paints can mix all other paint colors. So, that is the center. Paint is mixed together.

Those three colors are like atoms inside the Sun. They combine and make light. Red, Yellow and Blue paint combine and make Orange, Violet and Green. Paints combine to make other paints. Those six colors, and six more in between mixes, are all put into a circle, a Color Circle. The circle goes around the sun like a planet travels around the sun. This circle is also like the equator of one planet. Other planets have different colors around their equators.

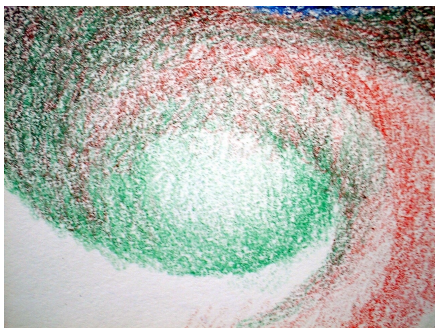
This circle has 12 colors in it. Other color theories have other numbers of colors in them. Paints are being mixed here and what is seen in paint is important so there are 12. It is logical to mix three versions of each pair of primaries, because that is what we can see and name easily. Yellow and Blue make Green. More or less of either Yellow or Blue

will change the Green to Yellow Green or Blue Green, however, they are all called Green.



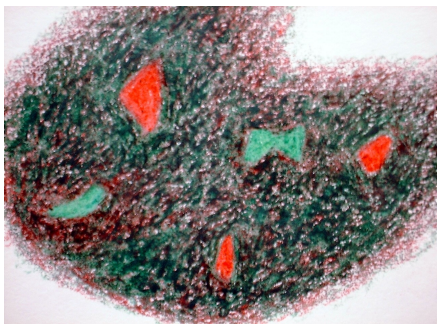
Mixtures are all composed of two Primary colors in each. All the mixtures are called Secondary colors. We can readily identify the centers as Orange, Violet and Green. Further mixtures easily make Yellow Orange, Red Orange, Red Violet, Blue Violet, Blue Green and Yellow Green. On another world Violet is called Purple and two of the three Orange colors go missing.

The center of the color wheel has a vertical shaft of grays rising perpendicular to the plain of the equator. White is at the top and black at the bottom. In between the Equator and the Poles are gray colors.



Some planets have satellites, some don't; some color theories, one at least, Munsell's, take into consideration brighter colors like fluorescents. They are likened to satellites sent into orbit around the sphere. They sit at a specific distance and in a fixed position beyond the sphere.
Different color theories make solids, like different planets, out of some basic common attributes of colors. **Hue** is what Munsell called the redness or greenness of a color. **Value** is how light or dark a color is, and **Chroma** is how gray or bright a hue is.

Those attributes make planets, some with satellites, brighter colors that don't fit into the normal scheme of things. There is another attribute that has gone missing.



Newton gave us the color wheel based on colors we see in a rainbow and can mix out of paint. There are 12 colors or hues. It is what is referred to as the Artist's color wheel.

Munsell gave us a set of 10 colors that is based on the fact that if you mix the three Primary colors together in the right amounts you get black paint. Subtractive color mixing is what this theory is called. It actually works. Two Primaries mixed together give you Secondary hues. Complimentary colors are what the exact paint mixtures are called. Each hue on Munsell's color wheel has a compliment that when mixed together results in gray, colorless, or black paint.

Another attribute of color theory needs to be added. Tertiary colors, Tertiary colors are
mixtures of three primary hues, all the other mixtures that are not complimentary. They are the ones that are now accounted for. Tertiary colors each have three primary hues in them. They include all complimentaries but the complimentaries do not include all the Tertiaries.

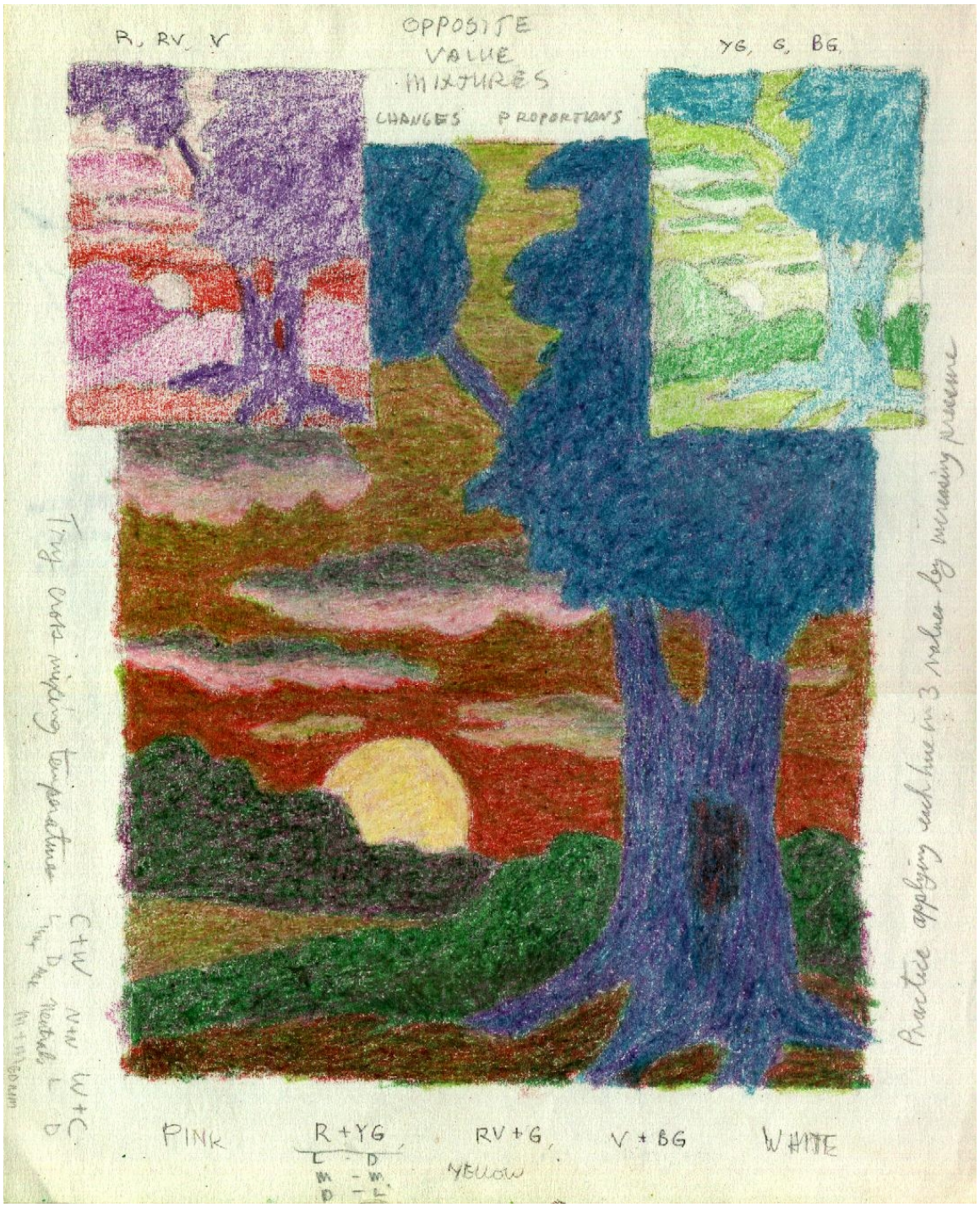
Tertiary colors are like the Asteroid belt. There are a limited number of them, at least at first count. If you use the 12 hue Artist's color wheel you can make 36 different Tertiary mixtures half and half. They become 72 if you name them the other way round but the colors remain the same no matter what they are called. YG+RV = RV+YG.

Now, if you mix in betweens as well, many more colors result. If you add white you get more, if you add black you get more, if you add gray you get more. So, Tertiary colors take us rapidly out to the Ort Belt.

The graphic for Tertiary colors is used to show a simple mix of two hues. Both triangles are the same size. The mix in the middle is rough and broken and shows each of the two colors that were used. No labels are used for Tertiary colors. No names are applied to them. We only need to look at them to know what is needed to use them for art. If a name were to be applied to the graphic for all Tertiary colors it is a "Kite." It takes an artist up and out of this world of words, labels, numbers and color scales and into space where there are many other colors that are unnamed and not counted.

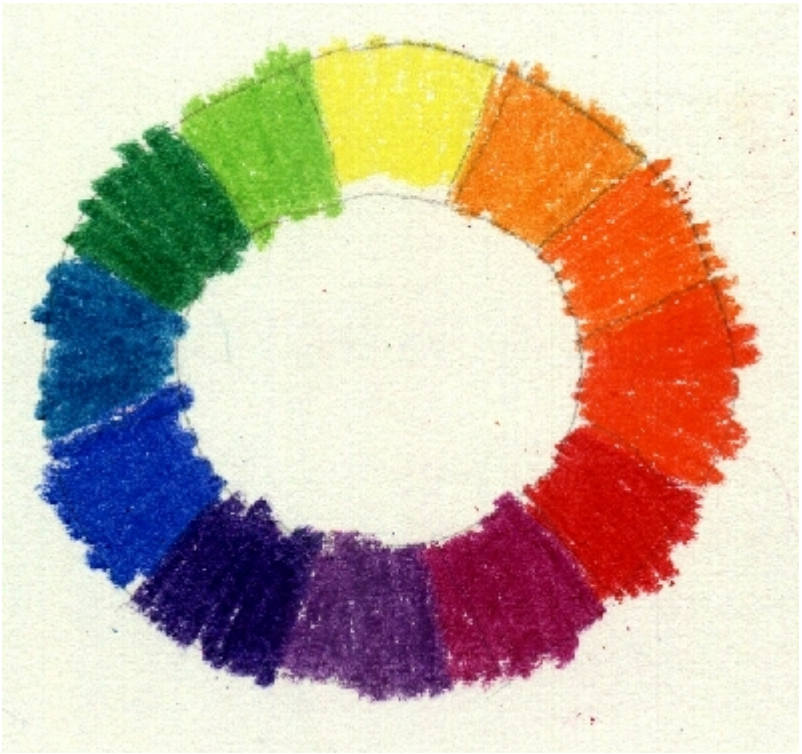
RV V BV
SAME TEMPERATURE MIXTURES.
SAME VALUE MIXTURES
TWO VALUES OF EACH HUE
YG G BG
LIGHT WARM > CLOSE
RV-YG
V-G
BV-BG
COOL DARK > FAR
COLOR A LIGHT AND A MEDIUM VALUE OF EACH OF THREE ANALOGOUS HUES THAT MIXED MAKE TERTIARY COLORS.

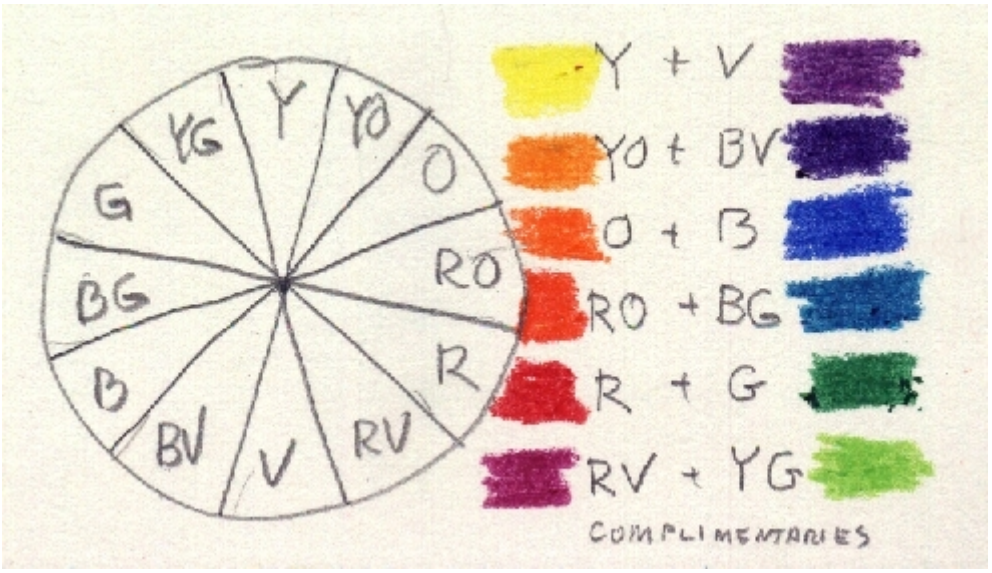
The two little pictures represent two layers this full color larger picture went through in making it. It was first colored with the three violets, then, it was colored over top with the three greens. Each hue has two areas, one for a light version and another for a darker version.



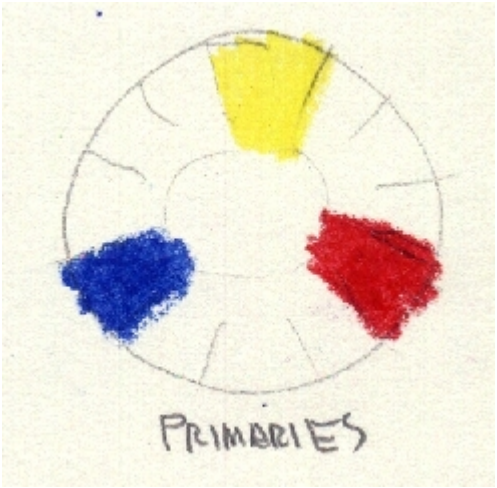

There was no way I knew what would happen when I chose the hues for this picture unless it was intuitively. Notes in the margin explain it; at least, the hues that were used are named. Two little pictures at the top are how the large picture was filled in. One layers was completed as shown then the other was mixed over top of the first.

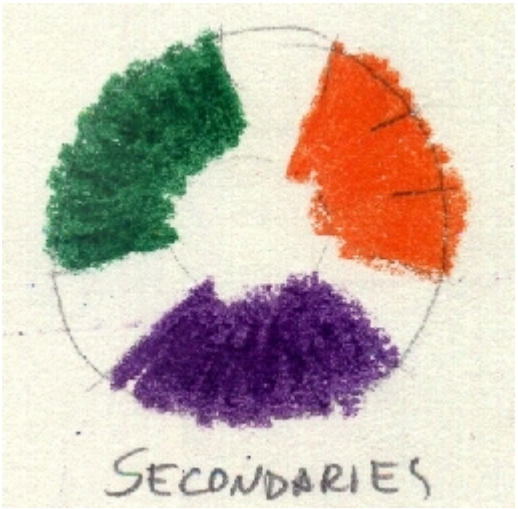
# Selecting Tertiary Colors



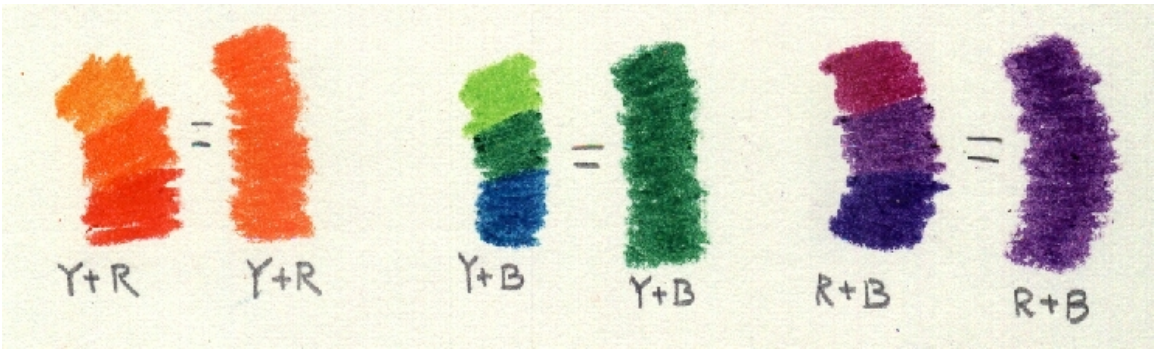



Alright, here is our color wheel again. This time, complimentary colors have been chosen. Complimentary colors are opposite each other on the color wheel. Yellow is a primary hue and opposite is Violet, which is a secondary hue. Violet is made of Red and Blue. So, Yellow is shown with a mixture of Red and Blue. Opposite colors are the most different from each other and balance each other.

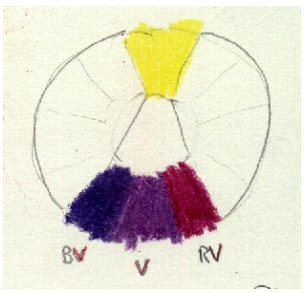


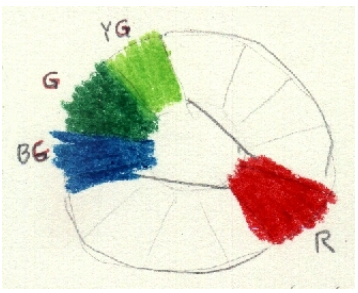



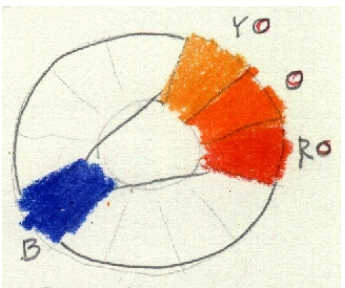

A color wheel is made up of Primary hues and Secondary hues. There are more secondary spaces because we mix two primary hues together and show three different mixtures. In a box of 16 crayons we are provided with three greens, three oranges, and three violets.




Do mix some Primary colors together and make three or more Secondary colors yourself. Copy these charts. This idea must be firmly in mind: there are two Primary hues in each Secondary and all Secondary hues on the color wheel have only two Primary colors in them. There are no Tertiaries on a wheel.

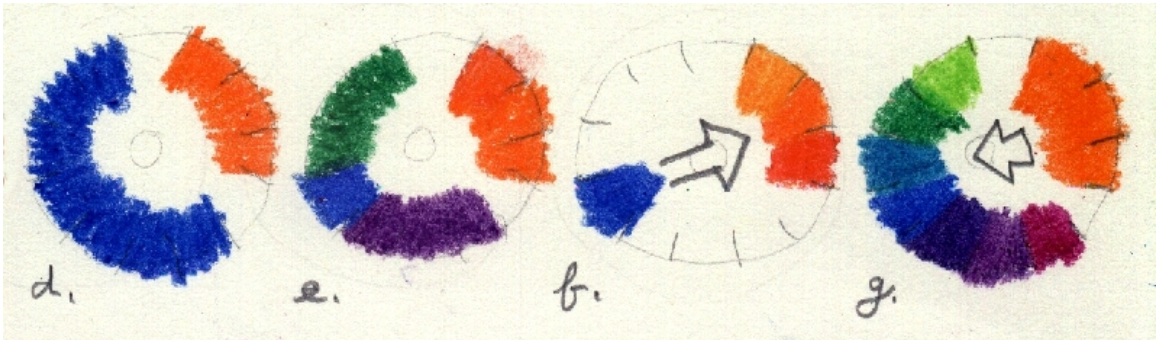



Yellow will make Tertiary color mixtures with each of the three Violets, Red will make Tertiary color mixtures with each of the three Greens, Blue will make Tertiary color mixtures with each of the three Oranges. Now, that is when we start with a Primary color.

Start with a secondary color. Look for hues that have the missing Primary in them. The near opposite Primary hue is the pure color that is missing. There are secondary mixtures that have the primary in them that make tertiary color mixtures. Lots of them.

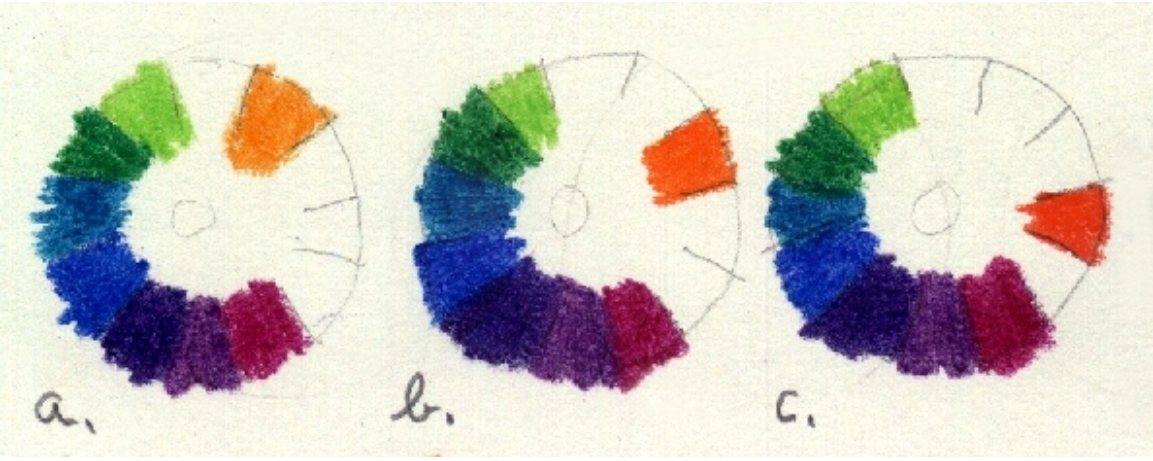



d. Orange and Blue are complimentary colors. They make tertiary mixtures.

e. Blue is mixed in the adjacent secondary colors, Violets and Greens.

f. Blue will make tertiary colors with the three orange secondary colors, but,

g. Orange hues will make Tertiary colors with 7 hues that have Blue in them!

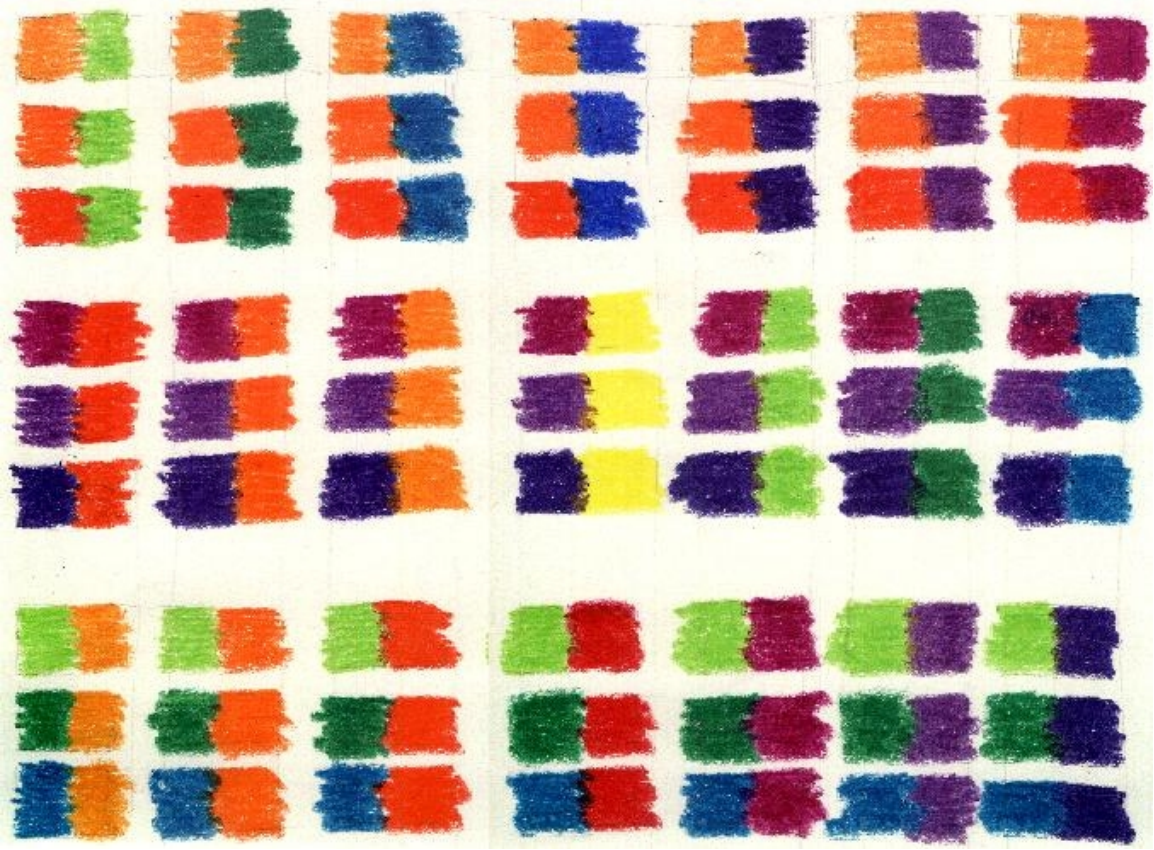


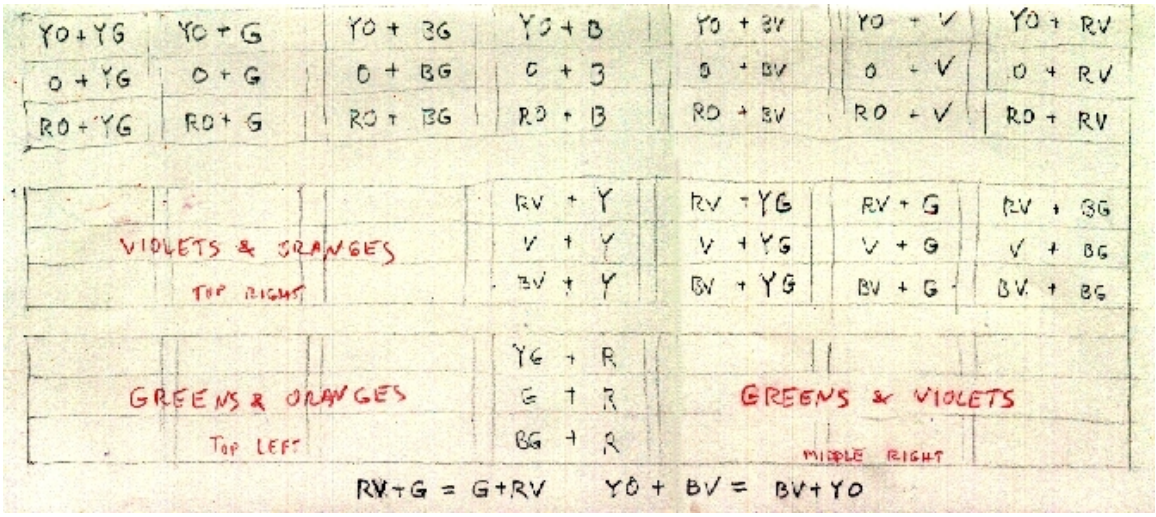

a. Yellow Orange will mix with three greens, blue, and three violets, one at a time.

b. Orange will mix with the same greens, blue, and violets, but the mixtures will look different than the Yellow Orange mixtures.

c. Red Orange will mix with Violets, Blue, and Greens, one at a time to make Tertiary colors.

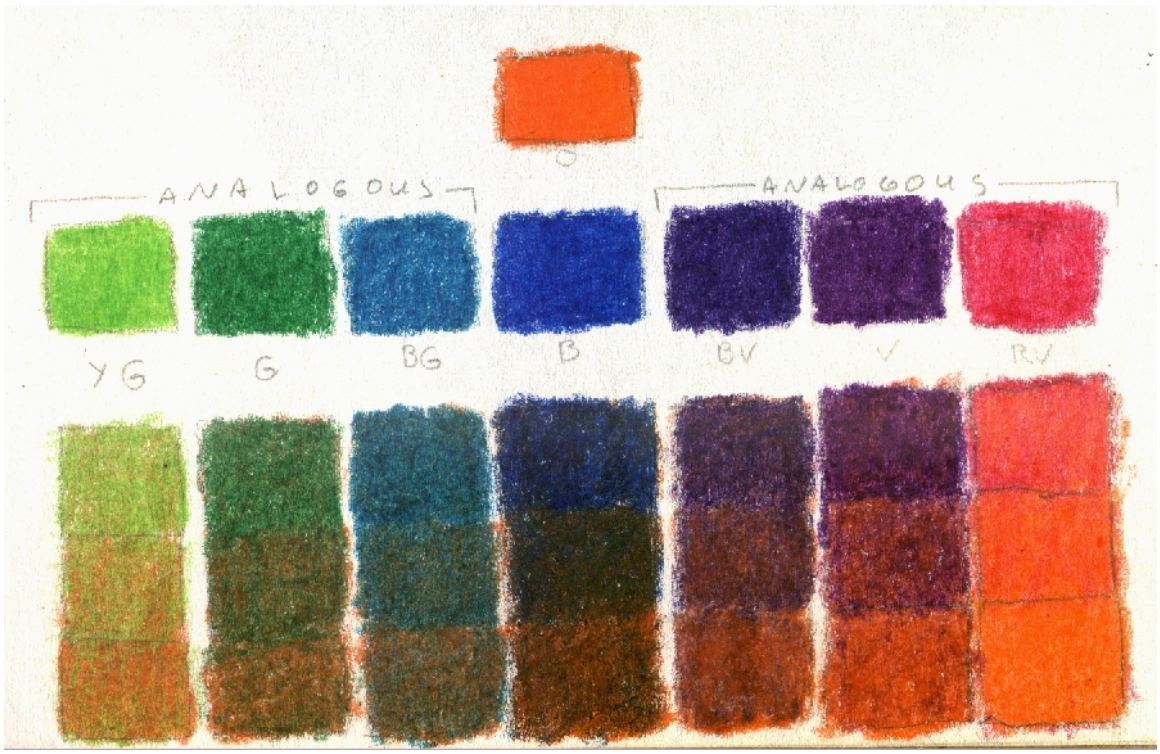
## All possible Tertiary pairs off a 12 hue color wheel






There are 63 possible pairs of colors to select off a 12 hue color wheel that make tertiary colors. However, some duplicate. Eliminate the duplicates and 36 remain. There are 36 unique pairs of colors off a 12 hue wheel that make Tertiary colors.

# Mixing Tertiary Colors

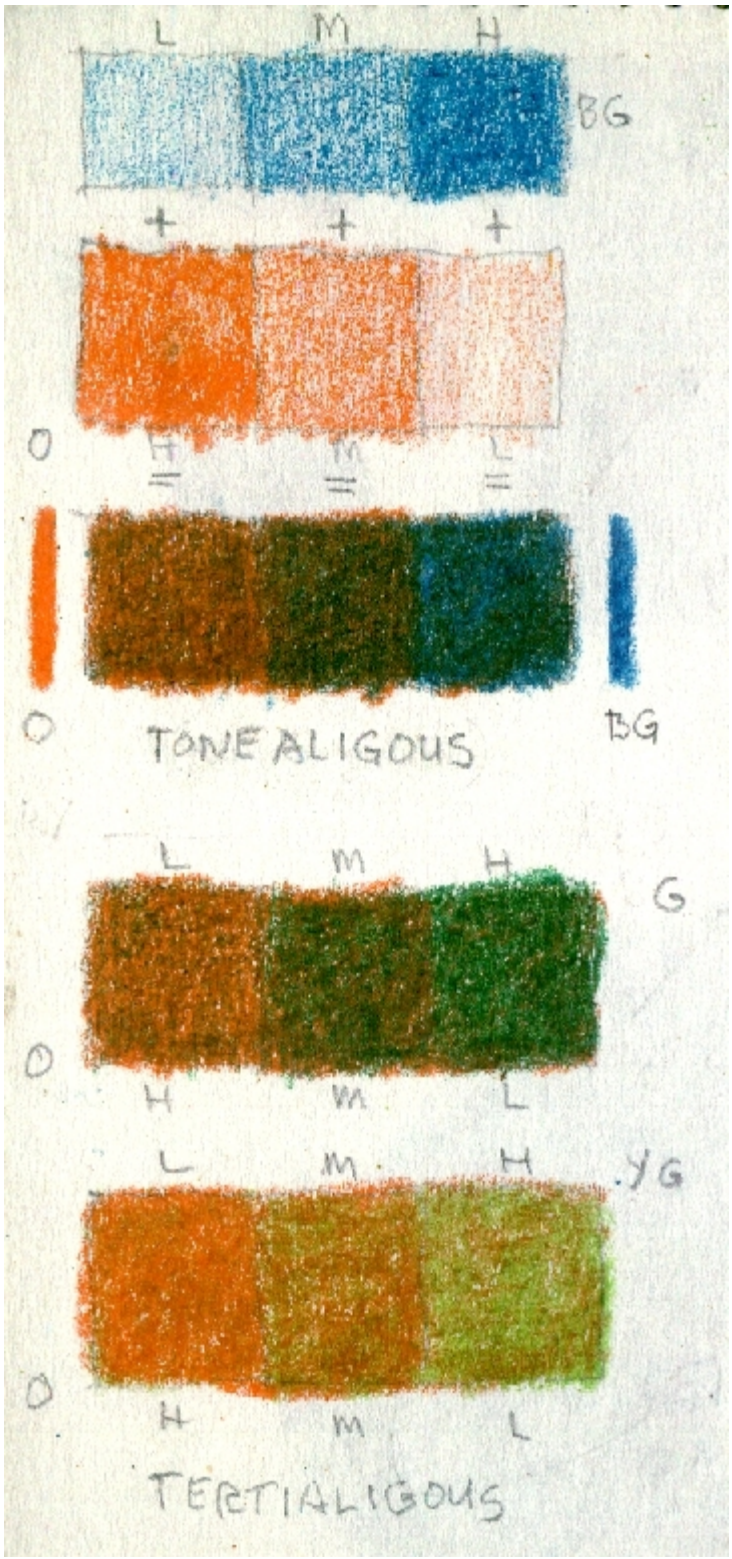



The standard way of mixing colors is to make scales. Shown above are some short ones made from Orange and seven secondary hues that each have Blue in them. A little bit of Orange is in the top row and a lot of Orange is in the bottom row. Crayons are colored in several layers so that all white paper dots are covered.

Crayons are mixed by coloring lightly over and over in many layers. A solid wax coating on the paper is the goal. Once that is achieved you will be able to see what color you have and not a tint of it made of left over white dots of paper showing through.

The top box shows such a tint. Nice looking pictures may be made that way. Nothing is wrong with them. However, learn to mix solid colors as another technique.

The bottom box shows the crayon Indigo as a solid wax coating. It may be seen through a little bit here and there. Wax is transparent and it stains the paper some. This is the way all my color samples are made. I don't scrape the colors, or heat the paper, or use water color paints with them. All I do is color crayons by hand with three different pressures, Light, Medium, and Heavy. Tickle pressure is what I tell the kids.




**B**lue **G**reen on top is applied to the paper in three pressures, **L**ight, **M**edium, and **H**eavy.

That layer is added (+) over or under another layer of **O**range, which is applied in the reverse order, **H**eavy, **M**edium, and **L**ight.

After doing that a few times, the third row appears. A line of the 'parent' hues is shown on either side of the scale of mixtures. Those added could make a five color scale.

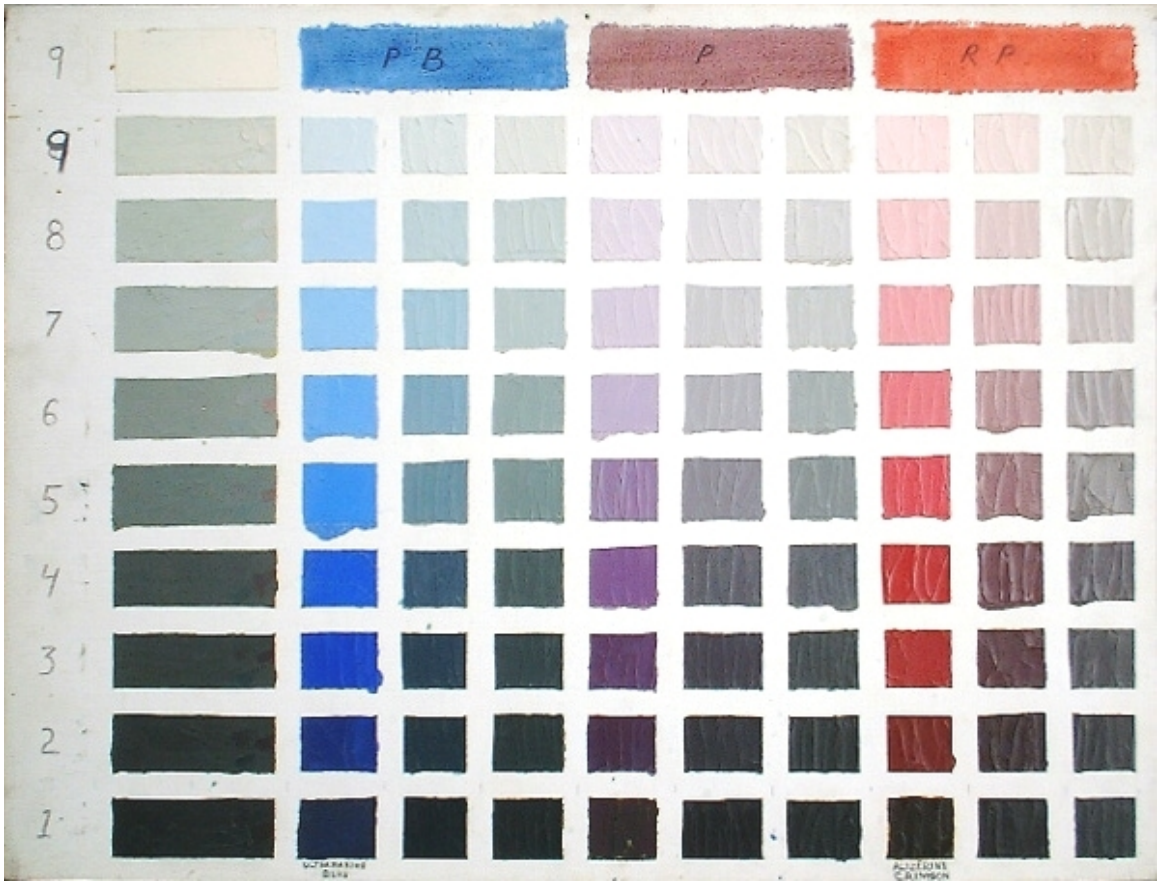
Further on down this page we see the other two greens made into other scales of their own. BG, G, and YG are Analogous colors. They lie next to each other on the color wheel. Each one has Yellow and Blue in the mixture. Orange has Yellow and Red in the Mixture. Red is added to the Yellow and Blue to make Tertiary colors. Since they are also Analogous I tried to join the two names. Terialigous or TerAligous seems to be the best name to use. That is because I have not talked about **TONE** as yet.

What is a **TONE**?

# Tones

A tone is a color or hue that is mixed with Gray. The word was coined by Munsell. He made a color theory that industry uses to mix paints by. Hue was also used by him.

Colors, according to Munsell, have three attributes, Hue, Value, and Chroma, later just called Tone. We've followed pretty closely to his theory so let's look closer at Tones.




On the left of this large 18" x 24" piece of canvas board side is a gray scale made of Ivory Black and Titanium White oil paints. Black is at the bottom and is numbered #1; White is at the top and numbered #10, or it is supposed to be. Along the top are the Hues. Ultramarine Blue is mixed with Alizarin Crimson sideways to make Purple. Each of the three Hues are mixed vertically with White to make pure bright value scales. Then, each value scale is mixed horizontally with gray, at the same value, to make Tones. The middle mixture is about half and half. The mixture on the right side has more gray than color it in. Masking tape was used between all the color paints applied. Paint was applied with a palette knife thickly as impasto. You can see the ridges. The paint never cracked and is hard as a rock now many years later. I keep this board clean and varnished. Values are supposed to remain constant when mixed with gray and need to be adjusted because they always go darker. To be correct this chart would need lighter tone values.

Crayon boxes also have tones in them if the box is one of the larger collections. 96 crayon boxes have a lot of samples to sort out. Here are some samples showing crayons selected so that they are in as close a hue family as possible while looking much more gray than the bright Hue.

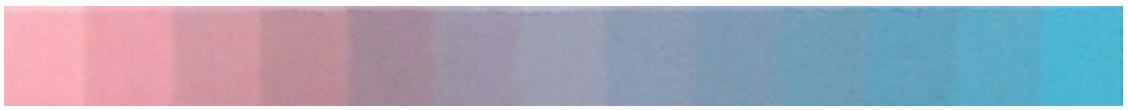
Gold metalic crayon is a tone of dandelion. Goldenrod falls inbetween them. Timber Wolf is a nice medium gray to mix tones with.

This idea of tones being supplied in a set of crayons helps to explain why there can be so many different crayons. Some are Hues; some are values, and some are tones.

Tones can also be brighter than Hues. Fluorescents are brighter colors than normal paints. Munsell allowed for that possibility in his theory. A hue may be brighter or duller, more or less saturated, more or less gray. New chemicals are being developed all the time.

# Complimentary Colors

I almost said ‘complimentary tones’ and that would not be correct. Tones are colors mixed with gray. Complimentary colors are opposite each other on a color wheel and if they are mixed together they are, in theory, supposed to mix gray. That is because if you mix Red, Yellow, and Blue together in the correct proportions you get Black. However, you will go nuts trying to mix perfect grays using complimentary colors; paints, even good oil paints, do not always act as theory says. Some will, some won’t. Pigments act differently and we can only get close to perfect gray mixtures using complimentary colors. The 12 hue wheel is not the color wheel to use for mixing grays. The Munsell color wheel is the one to use. It has two hues taken out. Yellow Orange and Red Orange are missing. It is a 10 hue wheel. Now those opposite complimentary hues do mix the closest grays. Shown below is a line from a large board that has RO and BG mixed as tints. Gray is made between them and it has been lifted in value to match either end of the scale. It was made using oil paints and can’t be very well duplicated in crayons.



Various mixture scales can be made with crayons. They will never be as fine as oil paints and that is a good reason to use oils. Crayons are best used with about three mixtures between any two so called complimentary color hues off any color wheel. That is easy to do and many great pictures may be made with only three mixtures.

Complimentary colors when mixed get darker, and they get grayer. Just a little bit of an opposite hue will darken a pure color at first. Add much more and the mixture will be “around” a central gray somewhere. That is especially so if you add some white crayon or paint. Mixtures of complimentary colors get very dark and will go black in one specific order. White added to a mixture of complimentary colors makes complimentary tints. They are not pure tints of color wheel hues. Because perfect complimentary colors will make gray, with white added, are they not quite tones either.

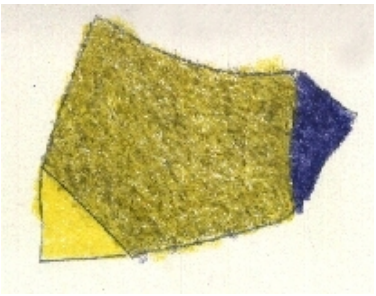
Tones are colors mixed with gray. Three primary colors, as found in complimentary colors, will make black. Once. Only one way. All the other mixtures are not black. They are not shades. They are tertiary colors.

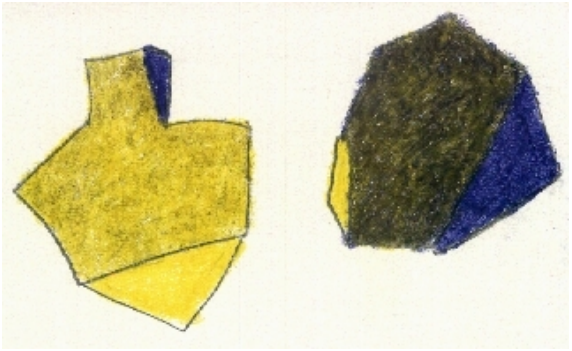
If you add white it is a tertiary tint. If you add black it is a tertiary shade. A shade is a color with black added. Since complimentary colors mixed get dark are they complimentary shades? They act that way. Darker is not always a shade as grayer is not always a tone. If the color balance is off you see other colors and they need to be differentiated from tones which are colors mixed with gray paint and shades which are colors mixed with black and so on. Tertiary colors are what I call them.

And I have learned a way to use them that is very profitable for an artist who makes pictures. I use “kites” for tertiary colors and not scales.

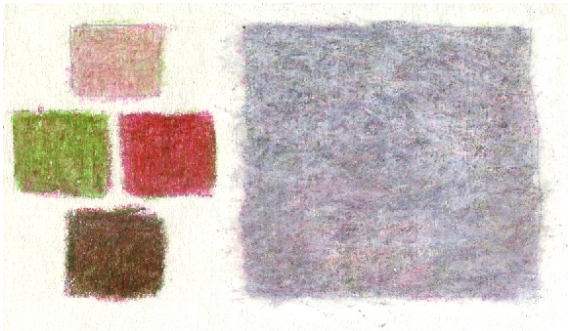
# Kites

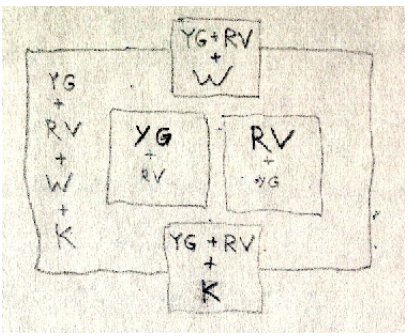
Kites are polygons with two triangles added that show tertiary color mixtures. The polygon holds the mixture and the triangles hold the pure colors being mixed. For even amount mixture of approximately half and half, visually determined, both triangles are the same size. It is easy to make three different mixtures using crayons. Uneven mixtures change the sizes of the triangles.





A Blue Violet, Indigo, is mixed in kites with a Yellow, Dandelion. One mixture is almost black. Just call the mixtures Tertiary colors and nothing more specific than that. Use the ideas to make pictures. Kites free you from grids that help explain ideas.






RV and YG are mixed together and with white and black then all together to make gray.

The same colors make a pretty good copy of an autumn leaf. Well, the leaf does look a little bit like one of my so called Kites and I guess that is why I was motivated to make it. Those colors in the chart above were mixed while tinkering with these ideas of tones, tertiaries, shades, tints, hues and so on, and the real colors of nature were discovered. Nature is full of tertiary colors! At least it is for me. Tertiary colors have been used together with old color theories to make a new one. Because it makes me able to copy nature, I like it, this new color theory from crayons.